K4D | Knowledge, evidence and learning for development

Water, sanitation and hygiene services in Pakistan

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Question

Please document the extent of water, sanitation and hygiene services (urban and rural) in the Khyber Pakhtunkhwa and Punjab provinces of Pakistan. Analyse the published literature on issues, solutions attempted and the impact in relation to KP/Punjab regions.

Contents

1. Summary

Access to water, sanitation and hygiene (WASH) services varies across and between Khyber Pakhtunkhwa (KP) and Punjab Provinces. The Government of KP's 2017 Health Survey found that 89% of households have access to improved water sources, and 85% have accessed to improved sanitation (Government of KP, 2017). In contrast, according to the Government of the Punjab, access to improved water sources is approximately 94% in the Punjab and access to improved sanitation is 72% (Government of Punjab, 2015).

Disparities exist between rural and urban areas, across wealth quintiles and between districts within each province. UNICEF (2015) argue that addressing these disparities is necessary to achieve universal sanitation. Open defecation is higher in rural areas than urban areas in both provinces (10.9% rural & 0.8% urban in KP, and 25% rural &10% urban in Punjab) (Government of KP, 2017; Agha, 2018). The Pakistan Approach to Total Sanitation, developed following devastating floods in 2010/11, is being implemented in both provinces by government agencies and non-governmental organisations (NGOs).

Sanitation is a gender issue: women and girls face a number of hidden difficulties in accessing sanitation (Ahmed, Miankhel, Kanaganathan & Villeminot, 2015). Due to cultural norms, women in households without access to improved sanitation often defecate in private (in the house or courtyard) and then dispose of the excreta (Ahmed et al., 2015). This has potential health consequences as well as dignity concerns. Menstruation is a social taboo in Pakistan and both WaterAid and the Government of the Punjab are working to increase menstrual hygiene management education in schools to create girl friendly environments and the opportunity for girls to stay in school (WaterAid, 2018; Aman, 2018).

Key findings from the report include:

- Access to drainage and the safe disposal of faeces are challenges in both provinces, and could lead to drinking water and soil contamination. The World Bank (2018) recommends shifting the emphasis from improving access to sanitation to improving the quality and safety of WASH infrastructure and the safe management of human waste.
- Water and sanitation related diseases are common in both provinces, for example, 18% of the Punjab's population reported diarrhoea (World Bank, 2017).
- The links between WASH, nutrition and stunting/wasting is receiving increasing attention from the Pakistani government, donors and NGOs. For example, the World Bank is developing a project to support the Government of Punjab's programme to decrease open defecation in order to combat child stunting. Punjab has the lowest rate of stunting of all the provinces (38% compared to KP's 49%) but the majority of Pakistan's stunted children live there, due to its large population share (World Bank, 2018).
- Poor water safety, poor hygiene and poorly sited and constructed pit latrines, as well as poor drainage can lead to drinking water contamination and waterborne diseases even in villages with access to improved water and sanitation, as illustrated by two case studies from KP (Nawab, Esser & Baig, 2017). Drinking water is not often treated, for example, 93.8% of household in the Punjab do not use any water treatment method (Government of Punjab, 2015).
- Poor hygiene is a problem in both provinces, including low rates of handwashing and poor water storage habits (World Bank, 2018; Nawab et al., 2017).

- Community awareness raising and education tools are important to bring about behaviour change, and also to combat beliefs including water being safe to drink if it is clear and does not smell (Shah, Khan, Kanwal & Bernstein, 2016).

There is a wealth of evidence related to the overall WASH status of Pakistan including the Joint Monitoring Programme and NGO strategies. During the course of this review, it was relatively easy to locate information related to the extent of services in both KP and the Punjab, but less easy to locate case studies on the challenges and issues of these services.

2. Overall access to WASH

This section draws on water, sanitation and hygiene (WASH) coverage estimates from the WHO/UNICEF Joint Monitoring Programme (JMP)[1]. Estimates for Pakistan are based on available country survey data, including the Social and Living Standards Measurement Survey (a national survey conducted by the Pakistan Bureau of Statistics). National estimates represent rural/urban population weighted averages.

Access to improved water and latrines has risen significantly across Pakistan in the last 15 years, largely due to self-provision e.g. privately bored hand and mechanised pumps and construction of household latrines (World Bank, 2018). The public sector provides virtually no piped water or sanitation in rural areas (World Bank, 2018).

Access to safe drinking water[2]

Pakistan is ranked in the top 10 countries with the greatest number of people living without access to safe water (Junaid, 2016). Most urban and rural water is supplied from groundwater, with over 50% of village households accessing drinking water from hand-pumps (Lerebours, 2017, p. 31). In saline groundwater areas, irrigation canals are the main source of municipal water (Lerebours, 2017, p. 31).

The JMP classifies water sources in to five categories, building on an earlier classification of improved, unimproved or surface water, as Table 1 shows.

[1] Country data is available to download from the JMP's website. Accessed 23 November 2018: https://washdata.org/data

[2] Accessed 23 November 2018: https://washdata.org/monitoring/drinking-water

Table 1: Drinking Water in Pakistan in 2015

	National	Rural	Urban
Safely Managed: improved source, on premises, available when need, free from faecal and priority chemical contamination	36	32	41
Basic Service: improved source, collection time not exceeding 30 minute roundtrip including queuing	53	54	51
Limited Service: improved source, collection time exceeds 30 minute roundtrip including queuing	3	3	2
Unimproved: unprotected dug well or spring	6	6	7
Surface Water: river, dam, lake, pond, stream, canal, irrigation canal	2	4	0

Source: https://washdata.org/data

Disparities exist between rural and urban access to safe drinking water. There are also differences between provinces. For example, in Khyber Pakhtunkhwa (KP) 35% of people use tap water as their main source of drinking water, compared to 18% in the Punjab (Junaid, 2016). Across Pakistan, there has been a shift from tap water to motorised pumping, largely due to the unreliability of government provision leading to households turning to self-provision (Junaid, 2016; World Bank, 2018). Poorer districts are more likely to rely on hand-pumps than better off districts (World Bank, 2018). The combination of hand-pumps and pit latrines increases the risk of water contamination due to seepage of human excreta into the water source (World Bank, 2018).

Sanitation[3]

Pakistan achieved the 2015 Millennium Development Goal for sanitation, reducing by half the proportion of people without sustainable access to basic sanitation: this included increasing rural access to sanitation to 67% from 23% in 1991 (World Bank, 2018b). However, this success masks disparities between rural and urban areas (World Bank, 2018b). Data from the Joint Monitoring Programme, presented in Table 2, illustrates the differences in rural and urban access to different categories of sanitation. The JMP Sanitation Ladder was revamped to monitor the Sustainable Development Goals and builds on the original improved/unimproved classification.

[3] Accessed 23 November 2018: https://washdata.org/monitoring/sanitation

Table 2: Sanitation in Pakistan in 2015

	National	Rural	Urban
Safely Managed: improved facilities, not shared with other households, excreta safely disposed of in-situ or transported & treated off-site	-	-	-
Basic Service: improved facilities, not shared with other households	58	48	74
Limited service: improved facilities shared between 2 or more households	8	9	8
Unimproved: pit latrines without slab or platform, hanging latrines, bucket latrines	22	24	18
Open defecation: disposal of human faeces in fields, forests, bushes, open bodies etc or with solid waste	12	19	0

Source: https://washdata.org/data

In contrast to the JMP, the World Bank (2018b) and Junaid (2016) state that 21% of people in rural areas practise open defecation. Ending open defecation involves not only providing facilities but also changing community behaviour (Junaid, 2016). Flush toilets connected to septic are the dominant access modality for rural households in KP and the Punjab that have access to improved facilities (World Bank, 2018).

The rural-urban gap also includes access to solid waste management services: an estimated 57% of households in urban areas and 6% in rural areas have access to a solid waste collection (Junaid, 2016). Closing the rural-urban gap remains a challenge (World Bank, 2018b). Junaid (2016) argues that providing sanitation for all in urban areas is complex challenge, especially when trying to find alternatives to expensive sewerage systems. Data gaps also lead to limited service delivery in urban areas in terms of the number of people and also poor resource identification (Junaid, 2016). Faecal sludge management is gaining attention: currently treatment of waste from pit latrines is expensive, neglected and poorly developed (Junaid, 2016).

The World Bank (2018) argues that virtually no investment has been made in the management of faecal sludge or wastewater. 42% of households in rural Punjab and 60% in rural KP has no drains (World Bank, 2018). Where drains exist, they are commonly open drains with no treatment of effluents, leading to water and soil contamination (World Bank, 2018). Only 10% of households in rural Punjab and 1% of households in rural KP has access to covered or underground drains connected to their toilets (World Bank, 2018). In urbans areas of KP and the Punjab, 4.1% and 59% respectively, have access to toilets connected to sewer systems: in urban KP households mainly rely on flush toilets connected to septic tanks (World Bank, 2018). The connection of toilets to drainage systems is a key indicator of their safety (World Bank, 2018).

In addition to a rural-urban disparity, there are also wealth differentials in terms of access to sanitation: 13% of the poorest have access to improved sanitation compared to 80% amongst

the richest (Junaid, 2016). Differences also exist between the provinces. In 2014-15, Punjab had the highest percentage of households reporting no toilet out of all the provinces at 16%, whilst in KP 12% reported no toilet (Junaid, 2016).

The Government's Pakistan Vision 2025 commits to increasing the proportion of the population with access to improved sanitation to 90%, halving the incidence of diarrhoea, and halving the food insecure population (World Bank, 2017).

Pakistan Approach to Total Sanitation

Following the 2010/11 floods, the Government of Pakistan developed the Pakistan Approach to Total Sanitation (PATS) as a country specific strategy to scale up sanitation programmes, particularly in rural areas to end open defecation (UNICEF, 2015). PATS endorses several models including community-led total sanitation, school-led total sanitation, component sharing, sanitation marketing and disaster response (Edouard-Tiberghien, 2016). It is backed by strong political will and increasing budget allocations (Edouard-Tiberghien, 2016). In 2014, the Government of Punjab began implementing PATS in 6% of villages across all districts (World Bank, 2017). The provincial government has allocated Pakistani Rupees (PKR) 400 million (USD 2.97 million) for sanitation (UNICEF, 2015).

PATS involves participatory community facilitation and mobilisation where communities self-analyse their sanitation status; awareness raising communications to inculcate hygienic behaviours; and communities constructing their own latrines at the household level (World Bank, 2017). It also emphasises the importance of post-intervention follow-up and support (Edouard-Tiberghien, 2016).

School-led total sanitation involves children as change agents, who are able to shift perceptions and habits at the household and community level; teacher-student WASH clubs that impart hygiene communication messages at scale; and, training programmes for teachers (Edouard-Tiberghien, 2016). Edouard-Tiberghien (2016) argues that school WASH interventions can help mitigate the risk of relapse into open defecation as students can stimulate new hygiene habits in households and represent the generation that will move communities from open defecation free (ODF) status towards improved sanitation.

UNICEF (2015) argue that closing equity gaps in sanitation remains a challenge: the majority of Pakistan's 25 million open defecators live in poor rural households or insecure informal settlements, making them the most difficult to reach. To maintain the gains already made and continue progress, UNICEF (2015) states that increased investment is needed to reach the unreached and sustain the social norm of no open defecation to ensure gains are sustainable. In UNICEF-funded programmes across Pakistan, extremely vulnerable families, identified by the communities themselves, are issued sanitation vouchers to purchase latrine construction materials (UNICEF, 2015). These latrines then act as 'demonstration' latrines for the community show-casing acceptable standards and design (UNICEF, 2015). In 2016, UNICEF developed PATS-Plus, a new enhanced programme to combat the risk of relapse into open defecation (UNICEF, 2016).

Hygiene[4]

The JMP utilises handwashing with soap as the indicator for hygiene. Table 3 shows the availability of handwashing stations with soap and water across Pakistan.

Table 3: Hygiene in Pakistan in 2015

	National	Rural	Urban
Basic Service: handwashing facility on premises with soap and water	60	46	83
Limited Service: handwashing facility on premises without soap and water	31	43	12
No facility	8	11	5

Source: https://washdata.org/data

Junaid (2016) argues that in order to improve hygiene in Pakistan efforts are needed to develop tools and strategies to encourage hand-washing promotion by community health workers and outreach workers, as well as work in schools to empower children as hygiene ambassadors and agents of change within their families and communities.

WASH and nutritional status

The World Bank's (2018) Water Poverty Diagnostic argues that despite significant improvements in access safe water and sanitation and reduction in open defecation, two critical markers of child health, rates of diarrhoea and stunting, have shown virtually no signs of decline. This can be attributed to a lack of significant investment in the safe management of faecal waste (World Bank, 2018). Pakistan's focus on eliminating open defecation centred around rapidly expanding access to latrines: a lack of attention to faecal waste management has led to 'unprecedented concentration' of untreated faecal waste near human settlements (World Bank, 2018). This has led to surface and ground water contamination as well as soil contamination, which increases the channels for oral-faecal transmission (World Bank, 2018).

In Pakistan, 39,000 children under the age of 5 years die annually: 88% of these deaths can be attributed to unsafe water and inadequate sanitation and hygiene (Junaid, 2016). Waterborne diseases are common across Pakistan, with three million people suffering annually (Junaid, 2017). According to the World Bank, the absence of a 24/7 water supply service increases the risk of waterborne epidemics across Pakistan (Edouard-Tiberghien, 2016).

The links between WASH, nutrition and stunting/wasting is receiving increasing attention from the Pakistani government, donors and NGOs. The World Bank (2018b) argue that research has linked poor sanitation to oral-faecal contamination and diarrhoea, which contributes to stunting and wasting. The 2011 Pakistan National Nutrition Survey found that for children under 5 years of age:

[4] Accessed 23 November 2018: https://washdata.org/monitoring/hygiene

- Pakistan has the 5th highest rate of stunting in the world (44%) and wasting has increased from 14.3% in 2001 to 15.1% in 2011;
- 31.5% of children are underweight.

In 2013, Pakistan joined the Scaling Up Nutrition Movement after the 2010 floods highlighted the critical nutrition situation (World Bank, 2017). In 2018, a new National Nutrition Survey will be conducted by the government in conjunction with the Agha Khan University and UNICEF, which will collect information on the nutritional status of women and children, food security and household water quality[5].

Wash in Schools[6]

In 2018, the JMP presented baseline data for WASH in schools, in Pakistan data was available for water and sanitation but not hygiene. As with household WASH, there is a disparity between rural and urban Pakistan, as Tables 4 and 5 show.

Table 4: Drinking water in schools in 2016

	National	Rural	Urban	Primary	Secondary
Basic Service: improved source available at school	57	-	-	52	81
Limited Service: improved source, but water not available	8	65	83	11	4
No Service: no water source or unimproved source	34	35	17	37	16

Source: https://washdata.org/data

A 2016 review of WASH in schools commissioned by WaterAid argues there are a number of challenges hindering sanitation progress, including poorly functioning School Management Committees, unresponsive school WASH planning, a lack of space on the curriculum for hygiene promotion, and functioning of facilities not included in official monitoring systems (Edouard-Tiberghien, 2016).

[5] Accessed 21 November: https://www.akdn.org/media/aku-govt-and-unicef-conduct-joint-national-nutrition-survey

[6] Accessed 23 November 2018: https://washdata.org/monitoring/schools/country-files-2018

The coverage of functional water supply services has decreased between 2008 and 2013, whilst coverage of improved sanitation facilities has remained stagnant (Edouard-Tiberghien, 2016). There are a number of bottlenecks, including a lack of specific policies, political will, coordination mechanisms and clear institutional frameworks as well as enforcement of quality standards (Edouard-Tiberghien, 2016). WASH facilities are generally of a better quality and cleanliness in private schools and madrassas compared to public education systems (Edouard-Tiberghien, 2016).

For example, in the Punjab, the Chief Minister's School Reform Road Map does not put specific emphasis of school WASH: toilets and tap-stands are listed are frequently missing facilities, but the focus has been on building classrooms and boundary walls (Edouard-Tiberghien, 2016). Muzaffargarh District Education Plan in the southwest stresses the need to build latrines in girls' school, but allocates very limited funds, which Edouard-Tiberghien (2016) suggests reveals the low priority it has been assigned[7].

Table 5: Sanitation in schools in 2016

	National	Rural	Urban	Primary	Secondary
Basic Service: improved facilities, single sex, and usable at time of survey	-	-	-	-	-
Limited Service: improved facilities, but not single sex or not usable	72	69	82	64	91
No Service: no facilities or unimproved	28	31	18	36	9

Source: https://washdata.org/data

3. Khyber Pakhtunkhwa

Nearly 93% of people in KP use groundwater for drinking water, which is hand or motor pumped from shallow zones (Nawab et al., 2017). A 2010 survey by the KP Provincial Reform Programme found that southern KP has problems with its groundwater: land aquifers are either deep (more than 500ft), which makes access difficult, or the existing water is salty and unsafe for drinking (Shah et al., 2016). Consequently, there is an elevated dependency on unsafe sources including ponds, springs and streams that are open to contamination (Shah et al., 2016).

[7] It is worth noting that district education departments have no authority over budget formulation and disbursement (Edouard-Tiberghien, 2016)

Across the province, less than 10% of the population is connected to the sewer system, instead relying on flushed pit latrines (Nawab et al., 2017). In rural areas, sanitation often implies the use of pit latrines (Nawab et al., 2017).

Access to safe drinking water

About 71% of the province has access to an improved water source (Lerebours, 2017). However, this figure masks rural-urban and inter-district disparities. It also does not consider water quality: many sources are not safe for human consumption (Lerebours, 2017). Access to piped water has declined from 41% in 2011/12 to 31% in 2013/14 (World Bank, 2016). The decline has been offset by an increase in usage of motorised pumps and springs (World Bank, 2016).

The 2017 Khyber Pakhtunkhwa Health Survey conducted by the provincial government included 14,825 households across the Province's 25 districts (3,825 in urban areas, 11,005 in rural areas[8]). The survey reveals a number of rural-urban disparities:

- 89% of the population have access to improved water sources: 96.5% in urban areas and 86.5% in rural areas;
- 22.2% are using piped water (piped into dwelling, plot or yard): 24.5% in urban population and 21.4% in rural population;
- 66.8% used another improved source and 11% use improved sources;
- 85% live in households with improved sanitation: 96% urban and 81% rural, and
- 77.1% of the population (93% in urban, 72% in rural) have both improved drinking water and improved sanitation facilities.

The 2017 Pakhtunkhwa Health Survey also illustrates great inter-district variations, for example:

- Upper Dir district has the highest percentage of people with access to piped drinking water (47.3%) compared to Charsadda, which has the lowest (1%);
- Marden district has the lowest percentage of people drinking water from unimproved sources (0.5%), and Kohistan has the highest (27.9%);
- Charsadda has the highest percentage of people with access to improved drinking water and improved sanitation (98.1%), and Kohistan has the lowest (34.3%).

Variations in access modalities also exist within districts. Lerebours' (2017) study for Action Against Hunger (ACF) into water governance in KP focused on rural Lower Dir District and employed mixed methods including key informant interviews and a household survey with 210 households. In Lower Dir access modalities included open wells (33.3%), surface water sources (18.8%), government water supply schemes (17.8%), water vendors (where water is trucked to household tanks, 17.8%), public boreholes with handpump (3.3%) and private boreholes with handpump (1.4%) (Lerebours, 2017, p. 23). Overall, 68.1% had a water source within the household premises (Lerebour, 2017, p. 24). In terms of sanitation, 90.6% in Lower Dir had access to flushed latrines, with 46.7% using latrines shared with other households (Lerebours, 2017, p. 24). Of the 60.6% of people who pay for water, 51.9% pay an amount decided by the government usually in monthly payments (96%) (Lerebours, 2017, p. 26).

[8] These numbers are taken from the report itself.

Government installed rural water supply schemes are a mix of pump based and gravity based schemes (World Bank, 2016). The provincial government has begun solarising water supply schemes: in 2013-2014, 130 water supply schemes were solarised and work was in progress to solarise 200 water supply schemes[9].

Access to sanitation and hygiene

The 2017 KP Health survey found that 85% of households across the province have access to improved sanitation. However, significant inter-district variations exists (Zaidi et al., 2015). For example, Chittral has the highest percentage of people using improved sanitation facilities (98.8%), whilst Tor Ghar has the lowest (50%) (Government of KP, 2017). There are also difference in terms of access to improved sanitation across wealth quintiles: 98% of the population from the highest wealth quintile have improved sanitation compared to 81% in the lowest wealth quintile (Government of KP, 2017).

Open defecation is more common in rural areas (Lerebours, 2017). Open defecation across the province is 8.4%, with 0.8% of urban households practising open defecation compared to 10.9% of rural households (Government of KP, 2017). Tank and Mardan districts have the lowest percentage of people practising open defecation (0%) and Tor Ghar has the highest (43.1%) (Government of KP, 2017). In urban areas, access to improved sanitation facilities is higher than in rural areas (Lerebours, 2017). In urban areas 3% of households are using unimproved sanitation facilities compared to 8.2% in rural areas (Government of KP, 2017).

According to data from the 2011 National Nutrition Survey, 62% of the population of KP practice handwashing with soap, compared to a national average of 57.6% (Zaidi et al., 2015).

WASH and nutritional status

Lack of access to safe water and poor sanitation are key contributors to undernutrition (Zaidi et al., 2015). In 2011, KP had higher levels of stunting (47.8%) than the national average (43.7%) and 24.1% of children were malnourished (Zaidi et al., 2015). There are regional disparities in the province: districts in southern KP have the greatest prevalence of undernutrition (Zaidi et al., 2015). KP as a whole has more undernutrition than other provinces (Zaidi et al., 2015). Challenges in tackling undernutrition in KP include district budgeting principles, which follow an even-sized approach across districts, results in hard to reach areas facing inadequate funding (in terms of travel costs and staff incentives); and, security concerns and low female mobility in conflict districts make outreach work more difficult (Zaidi et al., 2015).

Media reports and case study evidence from NGOs suggest high levels of waterborne diseases in KP. For example, a media report states that an estimated 54% of the province's residents are suffering from waterborne diseases and that drinking water in Peshawar is contaminated by wastewater as water pipes pass along sewer lines[10]. A second report claims over 50% of

[9] Accessed 27 November 2018: https://tribune.com.pk/story/1180711/alarming-statistics-50-diseases-k-p-caused-contaminated-water/

[10] Accessed 27 November 2018: http://www.ipublishing.co.in/ijesarticles/fourteen/articles/volsix/EIJES6047.pdf

diseases in KP are caused by drinking contaminated water[11]. An evaluation of ACF's disaster risk management project in KP illustrates the link between water, sanitation and health. For example, ACF constructed drainage channels in villages in Charsadda district, which stopped surplus water during monsoon season from laying stagnant, attracting mosquitos, and spreading malaria and diarrhoea (Ullah, n.d.).

The Khyber-Peshawar corridor is one of three core reservoir areas where the polio virus remains active: in areas with poor sanitation, the virus can spread easily from faeces to the water supply or by touch into food (Junaid, 2016).

Case studies

Pit latrines and drinking water contamination

A case study of drinking water quality in two villages in KP, Kot and Takht-e-nasrati (10,000 and 12,500 people respectively) collected and analysed water samples and held gender segregated focus groups (Nawab et al., 2017). Water access modalities include household wells in Kot, and public wells and boreholes in Takht-e-nasrati as well as a water filtration gallery in a seasonal stream, from which water is distributed to a community tank and then through gravity pipes to each household (Nawab et al., 2017). Focus groups in the two villages found that pit latrines are gradually replacing open defecation due to population growth, status symbols, and cultural and religious restrictions on the mobility of women, amongst other reasons (Nawab et al., 2017). In households without latrines, women defecate outdoors at night or inside the house in the day and dispose of the waste in the garbage dump or in agricultural fields (Nawab et al., 2017).

The case study illustrates that pit latrines do not necessarily equate to a sanitary environment and the importance of community awareness and education around WASH (Nawab et al., 2017). Both villages have improved water sources as per the JMP definition, however, 80% of people who visited the local hospital from Takht-e-nasrati had conditions linked to waterborne diseases (Nawab et al., 2017). This could be due to drinking water contaminated by seepage from pit latrines (Kot) and unsealed drainage systems (Takht-e-nasrati) (Nawab et al., 2017). Drinking water samples from both villages contained bacteria coliforms: approximately half of the Kot samples had very high levels, whereas more than half of the samples from Takht-e-nasrati were free from coliform bacteria (Nawab et al., 2017).

The focus groups revealed low community awareness of the health implications of wastewater and drinking water mixing and of how pit latrines can affect water quality, due to beliefs inherited from elders, including that seepage from pits is naturally purified when it moves about 5 metres through the soil (Nawab et al., 2017). Following results sharing and awareness raising sessions, remedial actions were taken in both villages including deepening boreholes in Kot to avoid contamination from pit latrines,m and a pipe repair fund in Takht-e-nasrati as well as a village committee to oversee repairs to stop wastewater mixing (Nawab et al., 2017).

Recommendations from the study include looking beyond individual protection strategies: households in both villages had built their pit latrines away from their household drinking source, however, in many case their pit latrines were sited close to their neighbour's drinking source

[11] Accessed 27 November 2018: https://tribune.com.pk/story/1180711/alarming-statistics-50-diseases-k-p-caused-contaminated-water/

(Nawab et al., 2017). Other strategies to reduce the potential for drinking water contamination include location-specific rather than regional or area as subsoil strata, which differs across locations, affects the potential for contamination; adjusting the depth of groundwater sources; and considering the potential for wastewater and drinking water mixing (Nawab et al., 2017).

Water quality in Tank District

Shah et al. (2016)'s case study of drinking water quality in rural Tank district identified a number of challenges including a low water table and seasonal water availability. Amongst the surveyed villages, 40% of households were using hand pumps for drinking water, 25% community tube wells, 16% wells, 13% pressure pumps at their homes, and 6% from rainwater (Shah et al., 2016). In the majority of cases distribution networks did not exist, and people were storing water in water tanks, open containers and pitchers (Shah et al., 2016). Time spent fetching water varied by water source, and ranged from 15 minutes from community tube wells (59% of people surveyed) to 60 minutes (15%) (Shah et al., 2016). In terms of sanitation, 58% were using pit latrines, 39% flush latrines, 1% piped sewerage system and 2% had no access to sanitation (Shah et al., 2016). There was a lack of proper drainage in the surveyed areas and open drains were not clean enough to operate at full capacity (Shah et al., 2016).

Doctors at rural health centres reported health problems for women due to fetching water since they were girls as well as waterborne diseases: 34% of patients report with diarrhoea, 25% with cholera, 19% with dysentery, 14% with typhoid, 8% with hepatitis (Shah et al., 2016). The majority of patients reporting are children (Shah et al., 2016).

Water quality tests showed bacteriological water contamination in tube wells, ponds and drains, and this is likely to play an important role in the incidence of water-borne diseases (Shah et al., 2016). Tube wells are not normally associated with poor water quality, and it is possible that contamination is due to poor water safety and hygiene, for example, not using appropriate containers to store water or not washing hands with soap (Shah et al., 2016). Consequently, Shah et al. (2015) recommend awareness campaigns to educate people about appropriate ways to collect, transport, store and use water in households including overall hygiene and awareness of inter-linkages between water safety and ill-health. Shah et al. (2016) argue that water quality testing can be an effective awareness-raising tool in communities as it combats the widely held belief that if water is clear and does not smell is good to drink.

IDPs

KP is home to both internally displaced people (IDPs) and refugees from Afghanistan. A case study of ACF's work in Peshawar, Nowshere and Kohat districts in 2013/14 with internally displaced families from an insurgency in the Federally Administered Tribal Areas, revealed the hidden difficulties women and girls face accessing sanitation (Ahmedet al., 2015)[12]. Cultural norms are a key barrier for women and girls, for example, women cannot use communal toilets as men may be present in the surroundings (Ahmed et al., 2015). It is common across KP for

[12] This case study is part of Action Against Hunger (ACF)'s support for WASH provision for IDPs in KP. Standard interventions include constructing boreholes and latrines, upgrading infrastructure, clean environment and solid waste management campaigns, hygiene education sessions, distributions of hygiene kits and building local capacity. However, during the 2013/14 response it became obvious that women and girls had unseen difficulties that the traditional intervention was not meeting (Ahmed et al., 2015).

women to defecate in the courtyard of their compound or isolate themselves in their house and then dump the excreta out in the open or in garbage pits (Ahmed, 2015).

A baseline survey found that 60-70% of women in the ACF project areas had no access to improved sanitation facilities (Ahmed, 2015). PeePoo kits were distributed as first emergency response solution, but this was an unsustainable solution as the kits can only be used once (Ahmed, 2015). ACF developed a 'female sanitation kit' with items for domestic usage, and constructed communal disposal pits in designated areas to provide a more hygienic and safe storage point of excreta (Ahmed, 2015). This emergency sanitation option was developed through consultation with the target community (Ahmed, 2015). The kit included a sanitary cloth, Dettol liquid, underwear, hand spade, pot for faeces, and rubber gloves; it allowed women and girls to cater for their needs without leaving the compound, as well as keep the house surroundings clean (Ahmed, 2015).

Ahmed et al., (2015) argue that the project has raised awareness of sanitation and gender in the communities and in the provision of emergency services by local staff. As part of the project, community volunteers ensure the correct use of sanitation pits and female sanitation kits and raising awareness of safe sanitation, leading to the construction and usage of toilets for every household according to cultural norms. Sanitation committees, comprising both men and women volunteers are continuing to spread messages (Ahmed et al., 2015). This emergency solution restored privacy and dignity to women, whilst including men in discussions about the location of pits and timing and manner of disposal of excreta, meant that male family members supported the initiative as their support was need for it to be a success (Ahmed et al., 2015). Ahmed et al. (2015) suggest that an emergency or displacement situation may be a good time to introduce topics such as sanitation to both host and displaced communities.

There are a number of limitations to ACF's emergency sanitation solution including a risk of contamination whilst handling the pots of excreta, but the situation is an improvement compared to the baseline (Ahmed et al., 2015). However, a hand-washing station was not included at the communal pits and would be difficult due to issues around ensuring ownership and responsibility for the daily water and soap supply (Ahmed et al., 2015).

4. Punjab

Access to safe drinking water

Despite the Government of Punjab investing significant funds in water supply and sanitation, the World Bank (2017) argue the development outcomes have been sub-optimal. Agha (2018) states that 49% of drinking water sources across the province provide safe drinking water. However, access to improved water sources is approximately 94% (Government of Punjab, 2015).

Table 6: Punjab drinking water system

	Rural	Urban	Total
Piped water	10	39	19
Motor pump	43	38	42
Hand pump	42	9	31
Other	6	14	8

Source: Agha, 2018

In rural Punjab, approximately 97% of households uses improved water sources, but 88% of water is unfit for drinking (World Bank, 2018b). Approximately 84.9% of households rely on self-managed groundwater extraction through handpumps and motorised pumps (World Bank, 2018b). Approximately 92% of households accessing piped water in rural Punjab receive piped water for 6 hours a day (World Bank, 2018b). The World Bank (2018b) argue that brackish groundwater and limitations of Operation & Maintenance (O&M) capacities in rural setups pose complexity in terms of technological choices, cost-effectiveness and sustainability (World Bank, 2018b).

Access to sanitation and hygiene

The 2013-14 Pakistan Social and Living Standards Measurement Survey found that across the Punjab, 75% of households use improved sanitation (67% rural and 92% urban), 8% use unimproved (8% rural, 1% urban), and 17% practise open defecation (25% rural and 1% urban) (Agha, 2018). There is the potential for groundwater contamination: 41% of the households that rely on groundwater either practise open defecation or use pit latrines (World Bank, 2018b)

There are both rural-urban and intra-province disparities in terms of access to sanitation. Access to improved sanitation is 66.8% in rural Punjab and 92.1% in urban Punjab (World Bank, 2017). 25.4% of the rural population practise open defecation, with poorer districts experiencing even higher levels (World Bank, 2018b). 40% of child excreta in rural Punjab is not being adequately disposed of (World Bank, 2017). In contrast, only 1.2% of the urban population practise open defecation (World Bank, 2017). In rural areas of Rajanpur District, communal toilets are common in the villages (WaterAid, 2018).

Across the province 23% have access to underground drains (5% rural and 56% urban), 5% to covered drains (5% and 4% urban), 43% to open drains (48% rural and 35% urban) and 29% have not access to a drainage system (41% rural and 5% urban) (Agha, 2018).

Over 33.8 % of households across the province lack access to safe excreta disposal facilities, which contributes to a high rate of waterborne diseases: 18% of the population report diarrhoea (World Bank, 2017). In the southern Punjab, 69% of the poorest households lack safe disposal facilities, which potentially contribute to higher levels of stunting in the south (World Bank, 2017).

The Government of Punjab aims to halve diarrhoea from 18% to 9%, improve sanitation coverage from 73 to 90% and achieve a 100% ODF Punjab by 2025 (World Bank, 2017). Of the Punjab's 25, 914 villages, government sources state that 9,069 have had ODF interventions;

8,830 have planned ODF interventions for 2018-2021; and 8,015 villages are in the planning process (Agha, 2018). The Public Health Engineering Department is currently working in all 36 districts on Punjab as part pf the provincial government's PKR 400 million PATS programme to end open defecation in over 3,500 villages (World Bank, 2017). PHED's Community Development Unit (a field team) engage in social mobilisation and help villages attain ODF status: the Local Government Department is the lead agency in verifying and certifying these villages as ODF (World Bank, 2017). Obstacles include both a lack of public infrastructure and household behavioural trends that lead to open defecation (World Bank, 2017).

The World Bank's (2018) water poverty diagnostic found that in rural Punjab and Sindh, soap was available near the handwashing station in only 25% of households; no respondents washed their hands with soap before feeding their children; and only 7% washed their hands with soap after cleaning their latrine or baby's bottom. This increases water contamination (World Bank, 2018). The diagnostic also found that 82% of households in rural Sindh with flush toilets connected to soak pits, had their toilet within 50 feet of their drinking water source: this increases the potential for water contamination, a cause of waterborne diseases (World Bank, 2018).

Menstrual Hygiene Management (MHM)

At the 2018 South Asian Conference on Sanitation, the Secretary for Women's Development Department gave a presentation on Menstrual Hygiene Management (MHM), which outlined actions the Punjab government has taken to date including:

- launching, in conjunction with Wateraid, a Punjab MHM Working Group in 2017;
- provincial consultations on MHM;
- a strategic planning workshop in March 2018 to develop a five year plan;
- provision of information, education and communication materials to schools; and
- inclusion of MHM in the female councillors' training manual (Aman, 2018).

Actions going forward include building departmental capacities on MHM; integrating MHM in ongoing sectoral programmes for women and girls; provision of women/girl friendly WASH facilities in all public and private facilities; and co-ordinating with School Education Department to include MHM in implementation of WASH in schools (Aman, 2018). Challenges include the social taboo and limited focus on MHM in sanitation (Aman, 2018).

WASH and nutritional status

In rural Punjab incidences of diarrhoea (17.4%) and stunting (36.7%) are high, and diarrhoea is the fourth largest killer, with 36,862 children dying in 2016 (World Bank, 2018b). Across the whole of the Punjab, the stunting rate is 33.5% (World Bank, 2017). Almost one in three children under 5 are moderately or severely stunted or too short for their age, 18% of children are too thin for their height, and 33.7% are underweight (World Bank, 2017; Agha, 2018).

Diarrhoea and stunting are both higher in districts where open defecation is higher (Agha, 2018). There is a disparity between rural and urban areas: 63% of the Punjab's population live in rural areas, but children in DG Khan Division, rural Punjab, are twice as likely to be underweight or stunted (44% and 47% respectively) than children in Rawalpindi division (21%) Poverty and income inequalities also play a significant role in determining nutrition outcomes: nearly half of the children living in households in the lowest quintile are stunted and underweight- creating a

nutrition crisis in Punjab that needs urgent attention (World Bank, 2017). High levels of stunting and malnutrition are a direct result of inadequate sanitation, amongst other factors (World Bank, 2017).

The Government of Punjab has introduced the Khadim-e-Punjab Child Stunting Reduction (KPCSR) Programme in 11 districts of southern Punjab and includes ODF targets (World Bank, 2017)[13]. A Nutrition Cell in the Planning Development Board is the coordinating and integrating platform for multiple sectors, including WASH (World Bank, 2017). The Housing, Urban Development and Public Health Engineering Department's WASH Stunting Reduction Programme 2018-2021 aims to create 4,630 ODF villages, support WASH in 3,500 ODF villages, build 1,200 school toilets and create 25 model villages in the selected 11 districts (Agha, 2018).

WASH health sector initiatives include Lady Health Workers promoting WASH messages in the community; school health and nutrition supervisors promoting WASH messages in schools[14]; training for health care providers on WASH; and stamping hygiene messages on patient slips (Agha, 2018).

World Bank planned programmes

Both of the projects outlined below are designed to contribute to the World Bank's Pakistan Country Partnership Strategy goal of changing the behaviour of 5 million people and 5,000 villages certified as 'open defecation free' (ODF) reducing the incidence of diseases (World Bank, 2017; World Bank, 2018b). Both projects are being implemented in the same districts and the Public Health Engineering Department is the main implementing agency for both projects (World Bank, 2018b). A Programme Management Unit will be established will be established in The Housing, Urban Development and PHED. Both projects are currently in the Bank's pipeline and are yet to be approved.

The Punjab Rural Sustainable Water Supply and Sanitation Project (World Bank, 2018b)

The World Bank is currently developing this project to provide safe, sustainable and continuous water supply for drinking and sanitation in select districts of rural southern Punjab. Project activities include:

- Development and improvement of safe drinking water infrastructure to enable 24x7, metered and affordable household level access;
- Development and improvement of safe sanitation infrastructure;
- Capacity development and support for government and institutional reforms.

This project will combat the challenge that inadequate sanitation poses for tackling malnutrition: inadequate sanitation is one of the major determinants of high levels of stunting and malnutrition.

The Punjab Sanitation and Nutrition Project (World Bank, 2017)

[13] As the first phase of this programme the provincial government has undertaken one-time cleaning in all 3,281 union councils (Agha, 2018).

[14] UNICEF in conjunction with the Govenrment of Punjab has created a training manual for school health and nutrition supervisors (Agha, 2018).

This project will reduce open defecation in targeted villages in 11 districts of rural Punjab through the PATS approach. It will support the Government of Punjab's KPCSR Programme by improving hygiene and sanitation, potentially working in 100 villages in the transition zones between the floodplains and the deserts of Cholistan and Thal. The KPCSR Programme has selected the 11 districts as they have the highest open defecation and stunting rates,.

Project activities include:

- Reducing open defecation through a community-based, nutrition sensitive, behaviour change approach involving community mobilisation: formation of village water, sanitation and hygiene committees, communication and messaging and training;
- Total sanitation interventions in selected villages by providing adequate drainage systems and piloting technologies, like oxidation ponds and solid waste management, to demonstrate models for replication in the rest of the Punjab, and
- Strengthen roles and capacity of service delivery institutions through training and IT solutions to demonstrate the sustainability of interventions and improve service delivery of all sanitation programmes in Punjab (World Bank, 2017).

Funding for the project includes USD10 million from the World Bank and USD50 million from the Government of the Punjab. Project interventions will account for gender by ensuring women's equal participation in project activities, representation in Village WASH Committees, and proactive involvement in decision-making. Women will be selected as 'Ambassadors of Change' from each village to advocate for improved sanitation and hygiene behaviour in partnership with the Village WASH Committee.

5. Selected projects

Aga Khan Development Network

Funded by the German Government, the Water and Sanitation Extension Programme (WASEP) has provided 12,000 households with safe drinking water between 2010 and 2014 in Gilgit-Baltistan Province and KP[15]. The project also installed 10,000 latrines, more than 12.000 household tap stands and 500 communal taps, as well as training members of the Water and Sanitation Committees that manage the O&M of WASEP schemes.

The WASEP programme began in 1997 and key components include community mobilisation and participation, potable water supply infrastructure, water quality management, grey water drainage infrastructure, household sanitation infrastructure, health and hygiene education in both communities and schools[16]. Overall programme results include

- 60% reduction in the level of waterborne diseases in WASEP villages according to an internal study;

[15] Accessed 26 November 2018: https://www.akdn.org/press-release/safe-drinking-water-and-sanitation-project-improves-lives-over-200000-people-gilgit

[16] Accessed 26 November 2018: https://www.akdn.org/our-agencies/aga-khan-agency-habitat/aga-khan-agency-habitat-water-and-sanitation-programmes

- 25% reduction in incidences of diarrhoea according to a World Health Organization (WHO) report;
- Water supply is WHO standard;
- Communities contribute in kind and in cash towards scheme construction and the O&M fund.

UNICEF

UNICEF is active in the rural sanitation sector across Pakistan. Between 2013 and 2017, it implemented the Sanitation Programme at Scale- Rural, which built on an earlier 2010-2012 programme supporting rural sanitation in flood-affected areas (AAN Associates, 2014). In 2017, in partnerships with civil society organisations, it reached over 1.4 million people with safe sanitation facilities and services and over 4,000 villages were declared ODF (UNICEF, 2017). In order to ensure gender mainstreaming in WASH programming, in 2017, UNICEF constituted village sanitation committees and school WASH clubs with equal representation of male and female members (UNICEF, 2017). The organisation has also worked with the Government of the Punjab to increase its capacity to deliver WASH services, including allocating sufficient resources for WASH (UNICEF, 2017).

In 2016, UNICEF completed a study of MHM needs in Balochistan and Punjab and piloted the provision of menstrual hygiene kits to 18,900 young women as well convening a forum with UN-HABITAT and partners to advocate for including these in education planning (UNICEF, 2016).

UNICEF (2016) argue that WASH facilities are particularly vulnerable to natural disaster and waterborne diseases spread rapidly in such situations. In 2016, UNICEF conducted risk mapping in all 35 targeted disaster prone districts and 216 community risk maps were completed in the Punjab (UNICEF, 2016).

WaterAid Pakistan

WaterAid work across Pakistan including Swat in KP and Muzaffargarh and Rajanpur in Punjab[17]. The organisation are implementing a city-wide approach in Jatoi city in the Punjab, which includes toilet construction and city-level systems for covered drains and wastewater treatment as well as working with local authorities[18]. Across Pakistan, WaterAid works with urban utilities and service providers to expand public services and conducts systematic scoping for faecal sludge management for small to medium towns and works to ensure residents of informal urban settlements are included in urban utilities networks on affordable tariff rates[19].

The Clean Healthy Pakistan campaign, in conjunction with UNICEF and Plan International Pakistan, targets people in rural and urban areas, including selected districts of KP and Punjab[20]. This behaviour change campaign primarily targets mothers and children between the ages of 5

[17] Accessed 28 November 2018: https://www.wateraid.org/pk/our-impact

[18] Accessed 28 November 2018: https://www.wateraid.org/pk/urban-programme

[19] Accessed 28 November 2018: https://www.wateraid.org/pk/urban-programme

[20] Accessed 28 November 2018: https://www.wateraid.org/pk/national-behaviour-change-campaign-on-wash

and 12 years, but teams also engaged fathers, youth, teachers and religious and community leaders as secondary and tertiary audiences. Campaign activities include monthly broad-based community meetings in each intervention village followed by mothers group sessions as well as visits to randomised selected households. At school level the campaign involves broad-based student assemblies/class-wide sessions in each intervention school followed by meeting and edutainment activities by WASH Clubs and teachers at school. Desired behaviour changes include handwashing with soap, MHM and improved personal hygiene; use and maintenance of hygienic latrines and an end to open defecation and urination; and safe water handling and treatment of contaminated water.

WaterAid also works in schools, installing water and sanitation facilities and supporting MHM education for girls: these activities can increase girls' access to education by creating girl-friendly environments (WaterAid, 2018). As part of their work on MHM they have developed a facilitator's guide for delivering MHM sensitisation in schools and to women's groups (normally in a household setting)[21]. WaterAid have been working on MHM in Swat and Muzaffargarh for six years[22]. This includes promoting WASH facilities that are suitable for MHM and for disposing of sanitary materials so that sanitation systems do not become blocked; promoting the supply, use and disposal of safe, appropriate, affordable and sustainable menstrual hygiene materials; and, ensuring women and girls have somewhere safe and private to wash[23].

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